

# System solution for data centres

Energy-efficient air conditioning with ServeLine

# Hoval

Responsibility for energy and environment



Cool IT smart – the modern solution for data-centre cooling

# The most compact system of its kind.

Hoval ServeLine air-conditions data centres and has minimum space requirements. Stand-alone compact units contain all components necessary to provide highly efficient cooling for the IT environment. What's more, they can be linked seamlessly so that the total output of the system can be scaled.

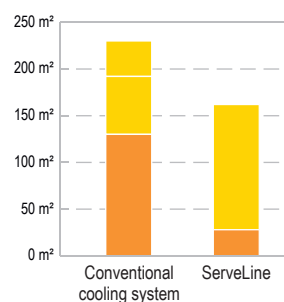
**Enormous space savings.** ServeLine uses the interaction of different resources to cool the IT environment with minimal energy consumption:

- Indirect free cooling with fresh air
- Indirect adiabatic cooling
- Mechanical cooling via cooling coil

All components for generating and distributing cooling energy and for treating air are particularly space-saving in stand-alone, ServeCool compact units each with an installation area of 11 m<sup>2</sup>. And if you include the maintenance area too, the space required is just 14 m<sup>2</sup> per unit. Only the cold-water production for covering load peaks is supplied separately.

**Flexible modular system.** ServeLine has a modular structure. It is made up of multiple ServeCool compact units with an integrated control system. These have no connections or maintenance points on the sides, making it possible to arrange multiple units directly next to one another to save space, making the total cooling output of the system freely scalable. It can be flexibly adjusted to the current growth phase of the data centre, allowing investment to be made in stages.

**Simply more compact.** A comparison with a conventional cooling system clearly shows that ServeLine is ahead of the game with its low space requirements:



**Data-centre cooling  
1000 kW cooling capacity**

This graph shows a comparison of the space required (including maintenance areas):

- Indoor installation
- Outdoor installation

If you assess the area inside with 1400 €/m<sup>2</sup> and the area outside with 500 €/m<sup>2</sup>, the comparison shows that ServeLine is ahead of its competitors.

	Conventional	Hoval ServeLine
<b>Area inside</b>	Water-cooled chilled water systems .....38 m <sup>2</sup> Air-conditioning units .....62 m <sup>2</sup>	ServeCool compact units .....134 m <sup>2</sup>
<b>Area outside</b>	Dry coolers .....130 m <sup>2</sup>	Chilled water systems....28 m <sup>2</sup>
<b>Total</b>	Space required .....230 m <sup>2</sup> Costs .....205.000 €	Space required .....162 m <sup>2</sup> Costs .....201.600 €





# Incredibly easy to maintain.

Hoval ServeLine is incredibly easy for the operator to maintain. Maintenance-relevant components are easily accessible, wear parts are commercially available and no special tools are required. All of this avoids unnecessarily high service and maintenance costs.

**Easily accessible.** The sophisticated ServeCool compact unit design ensures that maintenance can be carried out quickly and efficiently. Maintenance-relevant components, such as the filter, spray nozzles and actuators, can easily be accessed directly via the large service hatch: no dismantling necessary.

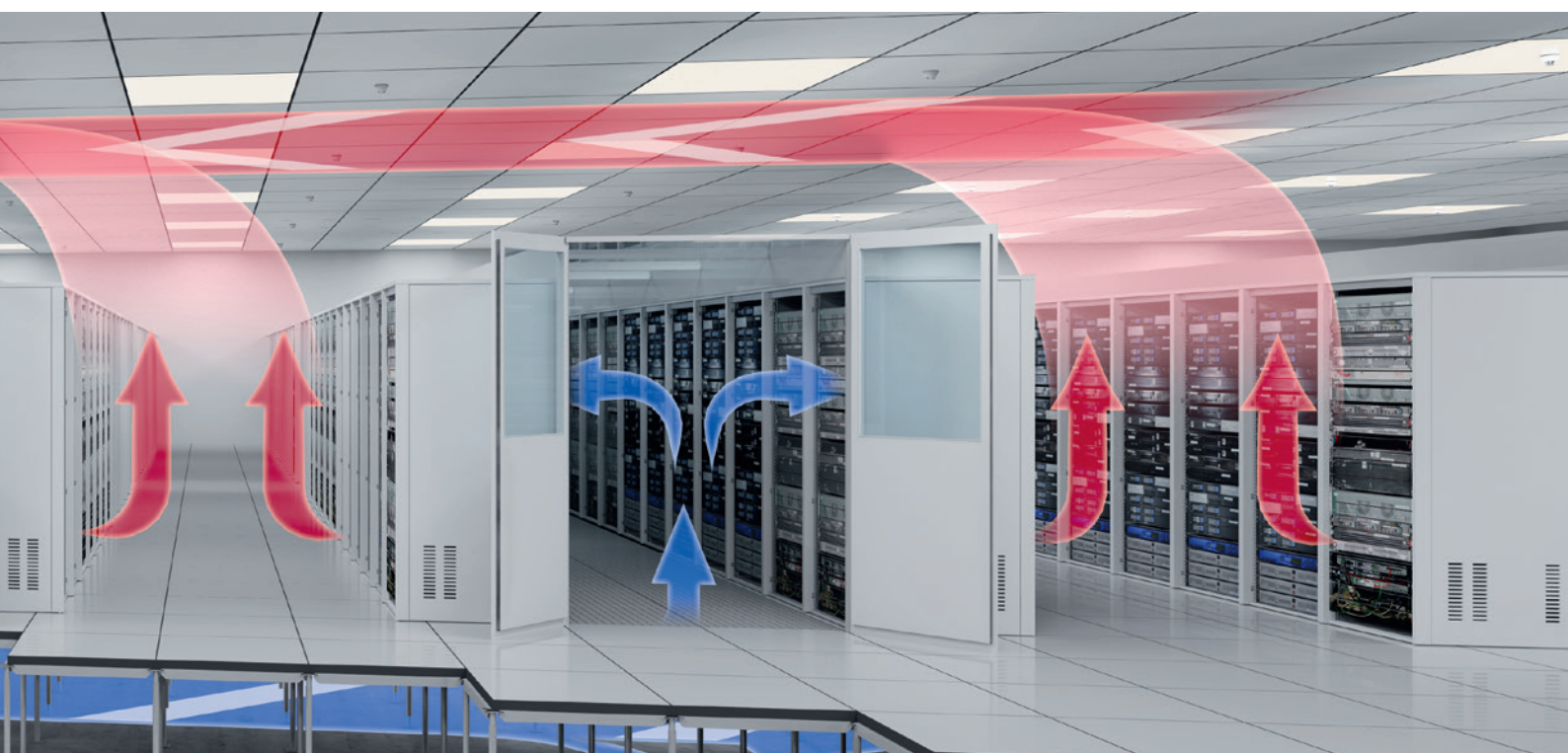
**Robust structure.** Only high-quality components are installed in the compact units. The plate heat exchangers in this design, for example, are used in even the harshest conditions on offshore wind farms. The fans boast highly efficient EC motors, have direct drive and are maintenance-free.

**Available on site.** All maintenance-relevant components (such as control units, sensors and fans) as well as wear and spare parts are standard products. They are generally available from specialist retailers, meaning that they are quickly available on site. There are no downtimes due to missing parts.

**Communication via Web browser.** The control box with the integrated control system is easy to access from the front. The software can be accessed on site directly via a LAN cable and a standard unit with any browser.



The graphical user interface of the control system can be displayed on any Web browser.



# The big advantage of free cooling.

Hoval ServeLine is setting standards with regard to using fresh air for free cooling. The high efficiency of the plate heat exchangers and the innovative condensation prevention system make this possible: cooling is performed with nothing but fresh air for over 90 % of the operating time.

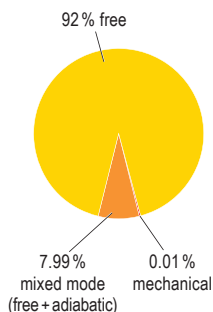
**Ultra-high efficiency.** ServeLine cools indirectly with high-efficiency twin plate heat exchangers. The exchangers are certified to Eurovent standards and, with a total exchanger surface area of 1200 m<sup>2</sup>, achieve an efficiency of 80 %. As a result, the free-cooling limit is only just below the supply air temperature supplied in the server room. For over 90 % of the operating time, switching on the adiabatic system or the chiller is not necessary.

**Sophisticated solution.** On request, ServeLine can be fitted with a condensation prevention system. This is controlled automatically and prevents humidity in the circulating air from condensing even when fresh air temperatures are very low. Free cooling can therefore be used throughout the year without the costly rehumidification of the supply air.

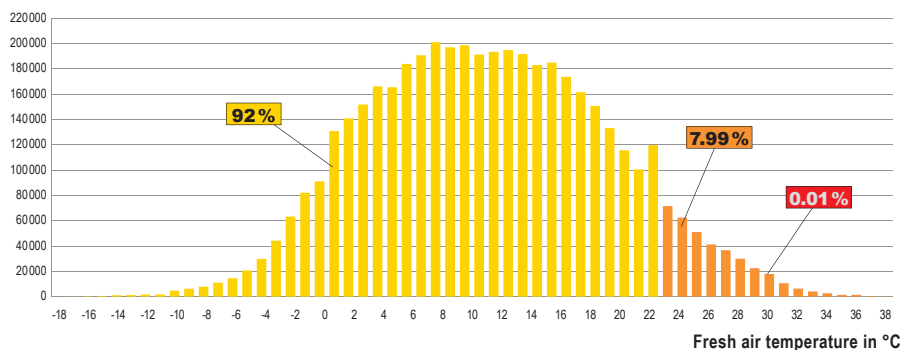
**Huge energy savings.** In the example below, a comparison of the annual curve of ServeLine with that of a conventional cooling system clearly shows the huge potential for savings:

- ServeLine reaches its full cooling capacity using only indirect free cooling up to a temperature spread of 3 K between fresh air and supply air.
- ServeLine only runs in mixed mode with free, adiabatic and mechanical cooling when the temperature and humidity values of the fresh air are high.
- Depending on location, the proportion of cooling via cooling coil is so low that in applications where slightly increased temperatures in the server room are permissible a chiller is not necessary at all.

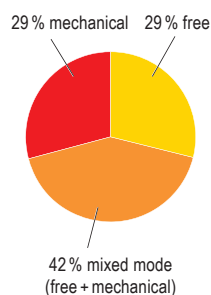
Operating modes



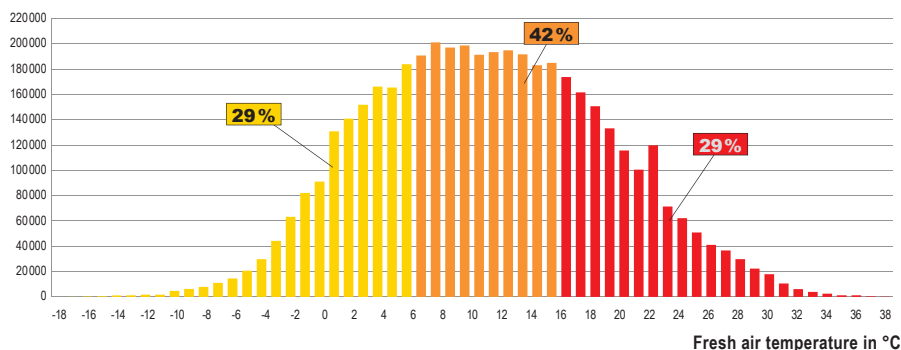
Cooling performance in kWh



Operating modes



Cooling performance in kWh



Reference: Extract air temperature ...36 °C  
 Supply air temperature ...24 °C  
 Cooling capacity .....500 kW  
 Location .....Mannheim (climate zone 12)  
 Climate data according to VDI 4710

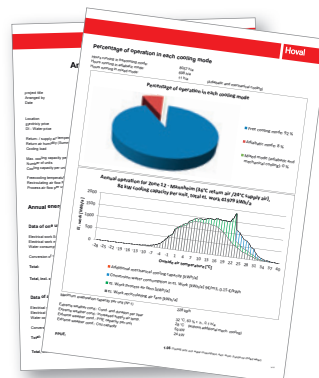
# Reliable planning with SECA.

The ServeLine Efficiency Calculator (SECA) quickly and reliably calculates the annual curve of Hoval ServeLine for any location. The calculation is based on certified measured values and fine-grained weather data, meaning that it provides maximum planning reliability.

**Efficiency in focus.** SECA is the name of the user-friendly tool for quickly and reliably designing ServeLine air-conditioning systems for data centres. Based on meteorological data for the planned location and the required cooling capacity, it calculates all data that is crucial for dimensioning the plant. In doing so, it makes it possible to simulate and compare different scenarios with regard to redundancy of the cold supply. The planner receives detailed data about the annual energy requirements, the distribution of operating hours in the various cooling modes, the water consumption for the adiabatic cooling, air volume currents, the free-cooling limit and more so that the plant can be optimised for the particular project (and for the gradual expansion) based on comprehensive information.

**Reliable data.** All calculations made using SECA are based on secured data. It uses Eurovent-certified databases and manufacturers' own performance libraries for calculating the plate heat exchangers and cooling coils. The theoretically calculated coefficients of performance have been measured and confirmed in a practical trial in the DMT laboratory in Essen (TÜV Nord).

**Precise values.** SECA uses precise weather data according to VDI 4710. Unlike in specially compiled data sets that are intended to represent an average weather pattern typical for the year, the calculations are based on exact temperature and humidity values that are recorded every 6 minutes. As a result, the calculated performance data is significantly more accurate, especially with regard to extreme weather conditions, and provides increased security during the design phase. With regard to expected climatic changes, SECA also provides the possibility of using weather data that has been generated based on regional climate models for 2021 to 2050 in calculations (TRY data 2035).



SECA calculates the annual curve and energy consumption of ServeLine for any location with a high level of accuracy.



Theoretically calculated data is checked again and again and verified with the utmost precision at both independent test institutes and at our in-house ServeLine testing facility.

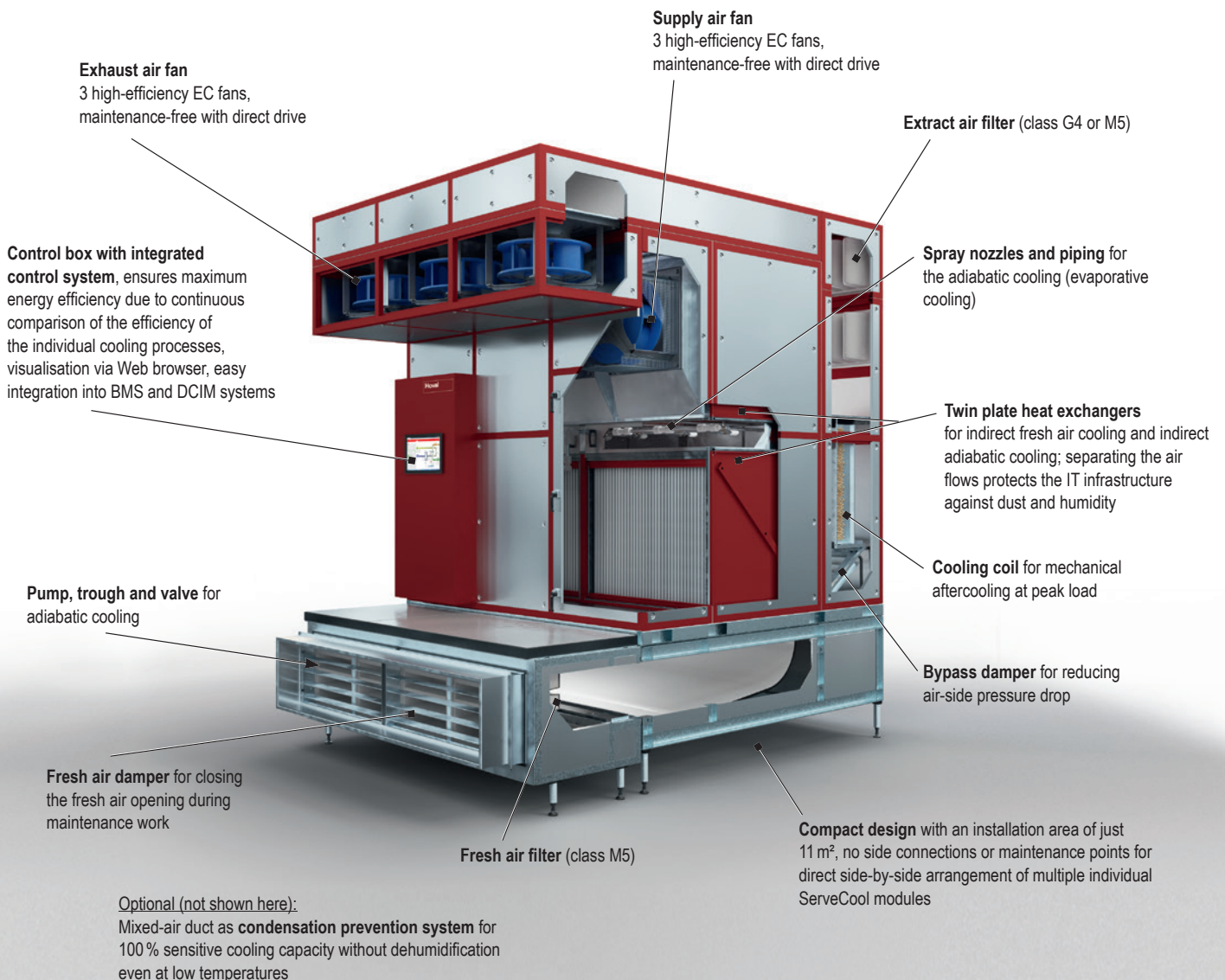


# Cool IT smart.

Hoval ServeLine cools the IT infrastructure with minimum space requirements and extreme energy efficiency. The system makes use of indirect free cooling with fresh air in combination with adiabatic and mechanical cooling. Thanks to the high efficiency of the heat exchangers and a sophisticated condensation prevention system, Hoval ServeLine uses free cooling much more intensively than comparable systems. The result of this is an intelligent cooling solution that guarantees operators of data centres the lowest total cost of ownership and maximum reliability.

<b>Economical</b> 	<b>Air conditioning with minimum space requirements</b>
<b>Easy to use</b> 	<b>Incredibly easy maintenance</b>
<b>Ecological</b> 	<b>Advanced use of free fresh air cooling</b>
<b>Sophisticated</b> 	<b>Maximum design reliability with certified data</b>

## ServeCool features



# Systematically saving energy.

Operators of data centres today are responsible for significantly reducing the energy requirements of IT infrastructure. The international company e-shelter colocation GmbH is meeting this challenge. The company has set up a new data centre in Rüsselsheim in the MW range, but the energy consumption is significantly lower than that of comparable systems. For air conditioning, e-shelter is using the solution developed in cooperation with Hoval.



## Facts

e-shelter data centre Frankfurt 3:

- 3 suites with a cooling capacity of 1 MW
- 9 ServeCool compact units are installed in every suite
- Performance tested by TÜV
- More than 83 % of the total operating time is exclusively indirect free cooling

## Intelligent cooling solution in the e-shelter data centre Frankfurt 3

Hoval ServeLine uses fresh air throughout the year to condition the environment of the high-tech servers. It cools indirectly using plate heat exchangers, meaning that the server rooms stay protected against dust and humidity.

- The system can provide the required cooling capacity of 120 kW per module using pure fresh air cooling up to a fresh air temperature of 17 °C. This means 6916 annual hours of high-availability operation with a supply air temperature of 21 °C without using even one compressor.
- From fresh air temperatures of 18 °C and up (an average of around 1258 hours per year), cooling is exclusively performed using the adiabatic system.
- During the remaining 130 hours in the year, the chillers are run under partial load in combination with the adiabatic system, allowing optimum efficiency to be achieved.

Hoval ServeLine also boasts an extremely compact, space-saving design. The system only requires an installation area of about 14 m<sup>2</sup> (including space for service and maintenance) for an output of 120 kW.

The instrumentation and control system developed with e-shelter uses an industrial controller and provides the optimum control strategy at all times. The system compares the efficiency of the indirect free cooling, the adiabatic and the mechanical cooling, thereby minimising the operating costs for the innovating housing provider.

## Responsibility for energy and environment

The Hoval brand is internationally known as one of the leading suppliers of indoor climate control solutions. More than 70 years of experience have given us the necessary capabilities and motivation to continuously develop exceptional solutions and technically advanced equipment. Maximising energy efficiency and thus protecting the environment are both our commitment and our incentive. Hoval has established itself as an expert provider of intelligent heating and ventilation systems that are exported to over 50 countries worldwide.



### Hoval heating technology

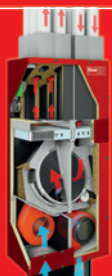
As a full range supplier Hoval helps its customers to select innovative system solutions for a wide range of energy sources, such as heat pumps, biomass, solar energy, gas, oil and district heating. Services range from small commercial to large-scale industrial projects.

### International

Hoval Aktiengesellschaft  
Austrasse 70  
9490 Vaduz, Liechtenstein  
Tel. +423 399 24 00  
[info.klimatechnik@hoval.com](mailto:info.klimatechnik@hoval.com)  
[www.hoval.com](http://www.hoval.com)

### United Kingdom

Hoval Ltd.  
Northgate, Newark  
Nottinghamshire  
NG24 1JN  
Tel. 01636 672711  
[heatrecovery@hoval.co.uk](mailto:heatrecovery@hoval.co.uk)  
[www.hoval.co.uk](http://www.hoval.co.uk)



### Hoval comfort ventilation

Increased comfort and more efficient use of energy from private housing to business premises: our comfort ventilation products provide fresh, clean air for living and working space. Our innovative system for a healthy room climate uses heat and moisture recovery, while at the same time protecting energy resources and providing a healthier environment.



### Hoval indoor climate systems

Indoor climate systems ensure top air quality and economical usability. Hoval has been installing decentralised systems for many years. The key is to use combinations of multiple air-conditioning units, even those of different types, that can be controlled separately or together as a single system. This enables Hoval to respond flexibly to a wide range of requirements for heating, cooling and ventilation.



### Hoval heat recovery

Efficient use of energy due to heat recovery. Hoval offers two different solutions: plate heat exchangers as a recuperative system and rotary heat exchangers as a regenerative system.